



**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR part 25**

**Docket No. FAA-2013-0902; Notice No. 25-13-25-SC**

**Special Conditions: Airbus, Model A350-900 series airplane; pitch and roll limiting by Electronic Flight Control System.**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed special conditions.

**SUMMARY:** This action proposes special conditions for the Airbus Model A350-900 series airplanes. This airplane will have a novel or unusual design feature(s) associated with the Electronic Flight Control System that limits pitch and roll attitude functions. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** We must receive your comments by **[insert a date 45 days after date of publication in the Federal Register]**.

**ADDRESSES:** Send comments identified by docket number FAA-2013-0902 using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.

- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery or Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov/>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Joe Jacobsen, FAA, Airplane and Flightcrew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone (425) 227-2011; facsimile (425) 227-1320.

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive on or before the closing date for comments. We may change these proposed special conditions based on the comments we receive.

### **Background**

On August 25, 2008, Airbus applied for a type certificate for their new Model A350-900 series airplane. Later, Airbus requested and the FAA approved an extension to the application for FAA type certification to June 28, 2009. The Model A350-900 series has a conventional layout with twin wing-mounted Rolls-Royce Trent engines. It features a twin aisle 9-abreast economy class layout, and accommodates side-by-side placement of LD-3 containers in the cargo compartment. The basic Model A350-900 series configuration will accommodate 315 passengers in a standard two-class arrangement. The design cruise speed is Mach 0.85 with a Maximum Take-Off Weight of 602,000 lbs. Airbus proposes the Model A350-900 series to be certified for extended operations (ETOPS) beyond 180 minutes at entry into service for up to a 420-minute maximum diversion time.

A special condition to supplement § 25.143 concerning pitch and roll limits was developed for the Airbus A320, A330, A340, and A380 Models wherein performance of the limiting functions was monitored throughout the flight test program. The FAA expects similar monitoring to take place during the A350 flight test program in order to substantiate the pitch and roll attitude limiting functions and the appropriateness of the chosen limits.

## **Type Certification Basis**

Under Title 14, Code of Federal Regulations (14 CFR) 21.17, Airbus must show that the Model A350-900 series meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-128.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model A350-900 series because of a novel or unusual design feature, special conditions are prescribed under § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the proposed special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and proposed special conditions, the Model A350-900 series must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36 and the FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

## **Novel or Unusual Design Features**

The Airbus Model A350-900 series will incorporate the following novel or unusual design features: an Electronic Flight Control system (EFCS), that when operating in its normal mode, will prevent airplane pitch attitudes greater than +30 degrees and less than –15 degrees, and roll angles greater than plus or minus 67 degrees. In addition, positive spiral stability is

introduced for roll angles greater than 33 degrees at speeds below  $V_{MO}/M_{MO}$ . At speeds greater than  $V_{MO}$  and up to  $V_{DF}$ , maximum aileron control force is limited to only 45 degrees maximum bank angle.

## **Discussion**

It is expected that high thrust-to-weight ratios will provide the most critical cases for the positive pitch limit. A margin in pitch control must be available to enable speed control in maneuvers such as climb after takeoff, and balked landing climb. The pitch limit must not impede likely maneuvering made necessary by collision avoidance efforts. A negative pitch limit must similarly not interfere with collision avoidance capability or with attaining and maintaining speeds near  $V_{MO}/M_{MO}$  for emergency descent.

Spiral stability, which is introduced above 33 degrees roll angle, and the roll limit must not restrict attaining roll angles up to 66 degrees (approximately 2.5g level turn) with flaps up and 60 degrees (approximately 2.0g level turn) with flaps down. The implementation of this spiral stability will require a steady aileron control force to maintain a constant bank angle above 33 degrees. This force must not require excessive pilot strength as stated in § 25.143(f).

## **Applicability**

As discussed above, these proposed special conditions apply to Airbus Model A350-900 series airplanes. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the proposed special conditions would apply to that model as well.

## **Conclusion**

This action affects only certain novel or unusual design features on the Airbus Model A350-900 series airplanes. It is not a rule of general applicability.

## **List of Subjects in 14 CFR part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

## **The Proposed Special Conditions**

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for Airbus Model A350-900 series airplanes.

In addition to § 25.143, the following requirements apply:

1. The pitch limiting function must not impede normal maneuvering for pitch angles up to the maximum required for normal maneuvering, including a normal all-engines operating takeoff, plus a suitable margin to allow for satisfactory speed control.
2. The pitch and roll limiting functions must not restrict or prevent attaining pitch attitudes necessary for emergency maneuvering or roll angles up to 66 degrees with flaps up, or 60 degrees with flaps down. Spiral stability, which is introduced above 33 degrees roll angle, must not require excessive pilot strength to achieve these limit roll angles. Other protections, which further limit the roll capability under certain extreme angle of attack or attitude or high speed conditions, are acceptable, as long as they allow at least 45 degrees of roll capability.

Issued in Renton, Washington, on October 22, 2013.

Stephen P. Boyd  
Acting Manager, Transport Airplane Directorate

Aircraft Certification Service

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